

AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions, and listings, of claims:

1           1.       (Original) A method of determining if a link is alive, comprising:  
2                   establishing a secure link between a first node and a second node  
3       according to a security protocol;  
4                   sending at least one ping message targeting the second node over the  
5       secure link, the at least one ping message defined outside the security protocol; and  
6                   monitoring for at least one ping reply to determine if the secure link is  
7       alive.

1           2.       (Original) The method of claim 1, wherein establishing the secure link  
2       comprises establishing a virtual private network session.

1           3.       (Original) The method of claim 1, wherein establishing the secure link  
2       comprises establishing a link protected by an Internet Protocol Security protocol.

1           4.       (Original) The method of claim 3, wherein sending the at least one ping  
2       message comprises sending at least one Internet Control Message Protocol message.

1           5.       (Original) The method of claim 1, wherein sending the at least one ping  
2       message comprises sending at least one Internet Control Message Protocol message.

1           6.       (Original) The method of claim 1, wherein establishing the secure link  
2       comprises establishing the secure link between first and second nodes each comprising a  
3       security gateway.

1           7.       (Original) The method of claim 6, further comprising sending at least one  
2       ping message targeting another node behind the second node.

1           8.       (Currently Amended) The method of claim 7, further comprising  
2       monitoring for at least one ping reply ~~form~~ from the other node.

1           9.       (Original) The method of claim 1, further comprising tearing down the  
2       secure link if the secure link is determined not to be alive.

1           10.      (Original) The method of claim 9, wherein tearing down the secure link  
2       comprises tearing down a security association according to an Internet Protocol Security  
3       protocol.

1           11.      (Original) A method of communicating with a remote node, comprising:  
2                    establishing a secure link between a first security gateway and a second  
3       security gateway, the remote node in communication with the second security gateway;  
4                    sending at least one ping message to the remote node over the secure link  
5       and through the second security gateway; and  
6                    monitoring for at least one ping reply from the remote node to determine if  
7       the secure link is alive.

1           12.      (Original) The method of claim 11, wherein establishing the secure link  
2       comprises establishing a secure link protected according to an Internet Protocol Security  
3       protocol.

1           13.      (Original) The method of claim 11, wherein establishing the secure link  
2       comprises establishing a virtual private network session.

1           14.      (Original) The method of claim 11, wherein establishing the secure link  
2       comprises establishing a secure link protected according to a security protocol.

1           15.      (Original) The method of claim 14, wherein sending the at least one ping  
2       message comprises sending at least one ping message defined outside the security  
3       protocol.

1           16.    (Original) The method of claim 15, wherein sending the at least one ping  
2 message comprises sending an Internet Control Message Protocol message.

1           17.    (Original) The method of claim 16, wherein establishing the secure link  
2 comprises establishing a secure link protected according to an Internet Protocol Security  
3 protocol.

1           18.    (Original) A system for communicating between a network element and a  
2 remote node, comprising:  
3                   a security module adapted to establish a secure link with the remote node,  
4 the secure link having a security mechanism according to a security protocol; and  
5                   a keep-alive module adapted to send at least one ping message over the  
6 secure link to the remote node, the at least one ping message defined outside the security  
7 protocol.

1           19.    (Original) The system of claim 18, wherein the security protocol  
2 comprises an Internet Protocol Security protocol.

1           20.    (Original) The system of claim 18, wherein the at least one ping message  
2 comprises an Internet Control Message Protocol message.

1           21.    (Original) The system of claim 18, further comprising:  
2                   an interface to a packet-based network, the secure link established over the  
3 packet-based network; and  
4                   a layer to control communications over the packet-based network.

1           22.    (Original) The system of claim 21, wherein the layer comprises an Internet  
2 Protocol layer.

1           23.     (Original) The system of claim 18, wherein the keep-alive module is  
2 adapted to further monitor for at least one ping reply responsive to the at least one ping  
3 message to determine if the secure link is alive.

1           24.     (Original) The system of claim 23, wherein the security module is adapted  
2 to tear down a security association of the secure link if the secure link is not alive.

1           25.     (Original) The system of claim 24, wherein the security association  
2 comprises an Internet Protocol Security protocol security association.

1           26.     (Original) The system of claim 18, wherein the keep-alive module is  
2 adapted to further monitor for at least one ping reply responsive to the at least one ping  
3 message to determine if the secure link is alive, the system further comprising a module  
4 adapted to establish a link over a secondary communication network if the secure link is  
5 not alive.

1           27.     (Original) An article comprising at least one storage medium containing  
2 instructions for controlling communications, the instructions when executed causing a  
3 controller to:  
4                 establish a secure link between a first node and a second node according to  
5 a security protocol;  
6                 send at least one ping message targeting the second node over the secure  
7 link, the at least one ping message defined outside the security protocol; and  
8                 monitor for at least one ping reply to determine if the secure link is alive.

1           28.     (Original) The article of claim 27, wherein the instructions when executed  
2 cause the controller to further establish an Internet Protocol security association for the  
3 secure link.

1           29.     (Original) The article of claim 28, wherein the instructions when executed  
2     cause the controller to tear down the security association if the controller does not receive  
3     the at least one ping reply.

1           30.     (Original) The article of claim 27, wherein the controller is part of the first  
2     node.

1           31.     (Currently Amended) A data signal embodied in a carrier wave and  
2     containing instructions for controlling communications, the instructions when executed  
3     causing a system to:

4                   establish a secure link between a first security gateway and a second  
5     security gateway;

6                   send at least one ping message to a remote node over the secure link and  
7     through the second security gateway; and

8                   monitor for at least one ping reply from the remote node to determine if  
9     the secure link is alive.

1           32.     (New) The method of claim 1, wherein sending the at least one ping  
2     message comprises sending the at least one ping message protected according to the  
3     security protocol.

1           33.     (New) The method of claim 1, wherein the security protocol comprises an  
2     Internet Protocol Security protocol (IPsec), and wherein sending the at least one ping  
3     message comprises sending the at least one ping message encrypted according to an IPsec  
4     security association.

1           34.     (New) The method of claim 15, wherein sending the at least one ping  
2     message comprises sending the at least one ping message protected according to the  
3     security protocol.

1           35.     (New) The method of claim 15, wherein the security protocol comprises  
2     an Internet Protocol Security protocol (IPsec), and wherein sending the at least one ping  
3     message comprises sending the at least one ping message encrypted according to an IPsec  
4     security association.

1           36.     (New) The system of claim 18, wherein the at least one ping message is  
2     protected according to the security protocol.

1           37.     (New) The system of claim 18, wherein the security protocol comprises an  
2     Internet Protocol Security protocol (IPsec), and wherein the at least one ping message is  
3     encrypted according to an IPsec security association.

1           38.     (New) The article of claim 27, wherein sending the at least one ping  
2     message comprises sending the at least one ping message protected according to the  
3     security protocol.

1           39.     (New) The article of claim 27, wherein the security protocol comprises an  
2     Internet Protocol Security protocol (IPsec), and wherein sending the at least one ping  
3     message comprises sending the at least one ping message encrypted according to an IPsec  
4     security association.